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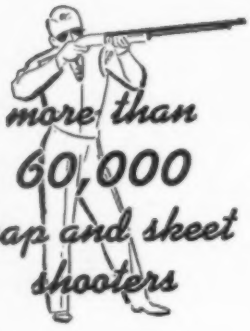

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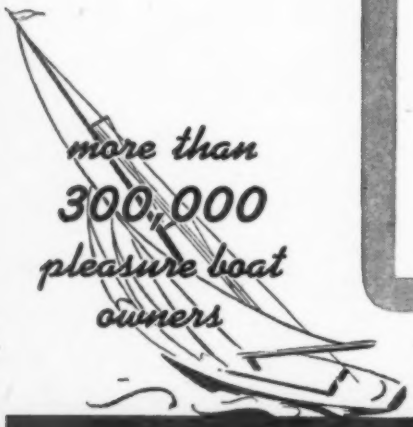

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Vol. 19 JULY, 1942 No. 7

FACTORS INVOLVED IN LOW AMPLITUDE CASES*

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Columbus, Ohio

CAUSES OF LOW AMPLITUDE

In studying the causes of low amplitude of accommodation it is convenient to differentiate the cases in which each of the two eyes has a low amplitude from the cases in which only one of a pair of eyes has a low amplitude. In the former, any one of the following factors may be expected to be responsible.

(1) The age of the patient.

(2) Bilateral paralysis of accommodation. This may result from various debilitated states of the system, grippe, syphilis, diabetes, and cerebral disease.

(3) Bilateral peripheral involvements. This includes direct involvements of the physical mechanism of accommodation as may be found in some cases of cataract, glaucoma, and trauma.

(4) Toxic systemic conditions. This proposed cause or low amplitude cannot always be differentiated from paralysis subsequent to abnormal systemic conditions. No methodical investigation has been made on the effect of a toxemia on the amplitude of accommodation, but there are a number of cases described in the literature in which the reduced amplitude or fatigue of accommodation are attributed directly to some systemic disorder involving toxemia.

Sumner[1] described three cases of diminution of the amplitude of accommodation which he attributed to chronically infected tonsils. Prangen[2] discussed twenty cases of reduced amplitude and concluded that, in general, subnormal accommodation is associated with a focal infection, especially those dental in origin. Blatt,[3] in his accommodatometer

*The author of this report is a White Haines Research Fellow at the School of Optometry, Ohio State University. Submitted on March 12, 1942, for publication in the July, 1942, issue of the AMERICAN JOURNAL OF OPTOMETRY AND ARCHIVES OF AMERICAN ACADEMY OF OPTOMETRY.

studies, associated weakness of accommodation with influenza, scarlet fever, all infectious diseases, exhaustion, encephalitis, distocia, severe neurasthenia, lactation, and haemorrhages. He reported finding accommodative weakness of a year's standing during lactation, pregnancy, and dysmenorrhea.

Wilmer and Berens,[4] in their aviation studies, reported that the accommodation as well as the convergence was commonly affected in pilots who were habitually poor landers. In these cases they were not helped by rest or muscle exercises. Rather, a focus of infection was frequently found, and many of them improved rapidly after removal of diseased tonsils, the extraction of teeth with abscessed roots, or the drainage of infected nasal sinuses.

(5) General fatigue and exhaustion. Wilmer and Berens,[4] in their work in the wartime air service, referred to the receded near point of accommodation often found in war pilots broken down from the strain of flying, altitude, loss of friends, and personal danger. They substantiated this observation by saying that, as a rule, it was found that a rest of a week or ten days did more to help the ocular conditions than keeping the men at the post and giving them muscle exercises.

(6) Lack of oxygen. This factor was early suggested by balloonists who at high altitudes could see well out over the horizon but frequently needed convex lenses to make barometer readings close at hand. Similar reports have been made by mountain climbers. A thorough investigation of this factor has been made by Berens[4,5,6] and his collaborators.

Their studies indicate that the single factor in the production of accommodative fatigue at high altitudes was the decreased oxygen content in the air. They showed that about half of a group of 148 men acceptable to the air service on the basis of visual requirements manifested an ergographic fatigue when placed in a low pressure chamber simulating conditions of high altitudes. The inhalation of oxygen invariably caused a return to normal even though the subject may have been kept at the equivalent of 20,000 feet in the low pressure chamber. Other observations were that these changes did not follow the cardiovascular reactions and that those having hyperopia and hyperopic astigmatism showed the most marked changes.

(7) Illumination. The quality of illumination may influence the

measured value of the amplitude as a result of changes in pupil size, chromatic aberration, and visibility of the test object.

Ferree and Rand[7] demonstrated an approach of the near point of accommodation at higher intensities of illumination. They obtained an increase in amplitude even with an artificial pupil. Also, when the illumination was compensated so that the same amount of light entered the eye with the artificial as with the natural pupil, there was yet an increase obtained. They concluded that the greater part of the increase resulting directly from higher intensities is inherent in the sensory and perceptive reactions while the lesser part was due to change in pupil size.

Possibly related to the intensity problem are the occasional reports of temporary losses of the power of accommodation induced by wearing colored glasses on long automobile drives.[8]

(8) Excessive near work. An excessive amount of near work is frequently referred to by refractionists[9] as a cause of fatigue with a resulting decrease in amplitude. Such an amplitude finding is used by some as evidence of overwork at near.

(9) Hypertonicity. This condition may theoretically affect the amplitude in either of two ways. If of long standing, it may result in an increased amplitude as a result of the constant use of the accommodative mechanism. If the condition is recent, it will appear to reduce the amplitude by the amount of hypertonicity. That is, the reduction in amplitude is the result, in such a case, of the change in far point rather than a change in near point of accommodation.

(10) Undeveloped amplitude. This condition may be found in absolute hyperopes who cannot accommodate sufficiently to gain an appreciable amount of clear vision, myopes who have no occasion to accommodate, and cases with large amount of astigmatism in which no sharpness of imagery is gained by accommodating. Two factors may contribute here to the lowered amplitude. One is the probable underdevelopment of the ciliary muscles and the other a lack of voluntary control of accommodation.

The following is a list of factors that may affect a reduction in amplitude of accommodation in only one of the two eyes.

(1) Monolateral peripheral involvements. These include direct involvements of the physical mechanism of accommodation as may be found in cases of cataract, glaucoma, and trauma.

(2) Monolateral paralysis of accommodation. This may be due to the paralysis of the third nerve, or that branch of the motor oculi which supplies the ciliary muscle and iris. Contusions of the eyeball and the use of mydriatics are other possibilities.

(3) Inability of one of the eyes to respond to a stimulus to accommodation. Most representative of this type are amblyopes who show a low amplitude in the amblyopic eye. Occasionally this phenomenon occurs in an eye with normal acuity. The cases studied so far have not yielded an explanation.

ANALYSIS OF CASES IN WHICH THE MONOCULAR AMPLITUDE FINDINGS OF BOTH EYES ARE APPROXIMATELY EQUAL AND LOWER THAN THE EXPECTED FOR THE AGE

First of all, the possibility of inadequate illumination can be checked by altering the illuminating conditions before making a retest.

If the low amplitude is supected to be the result of lack of control of accommodation, the following systematic procedure may be employed to identify the cause.

(1) Monocular push-up to blur test. This test may be employed whenever the frequently used method with minus lenses shows a low amplitude.

(2) Binocular push-up to blur test. If the monocular test is low while the binocular test shows a normal amplitude, the monocular amplitude test may be considered inadequate.

(3) Repeated push-ups. A large number of records[10] have shown that the maximum amplitude is attained only after several repeated push-ups. These records were obtained by means of an ergographic recording device for recording the near points of accommodation obtained in successive push-ups to blur. Thus if repeated push-ups show rapid increases in amplitude with an eventual reaching of a steady maximum, and if this maximum is at least equal to the expected for the age, that maximum may safely be considered as the true amplitude. Fig. 1 illustrates this phenomenon, the eye in this case being slightly amblyopic.

The ergographic testing device consisted of a movable fixation target mounted on an optical bench. A pencil which moved with the target made a continuous record on a time graph. The subject viewed the target through a phorometer trial frame fixed at one end of the optical bench. The phorometer trial frame, with prisms removed, held the necessary correcting lenses, and was so fixed that the moving fixation target followed the median sagittal line of the patient's head.

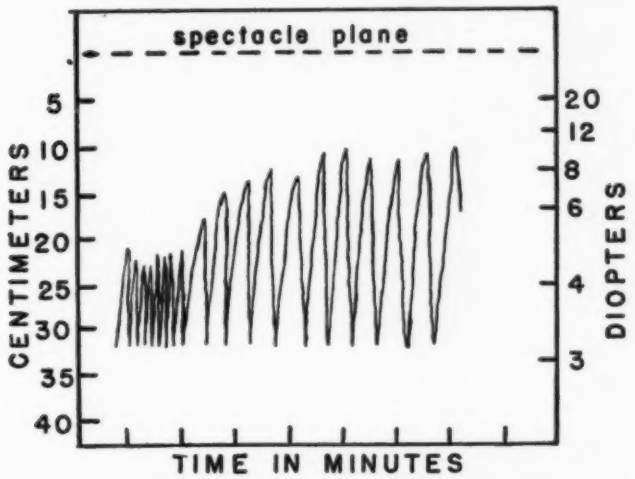

Fig. 1. ERGOGRAPH RECORD OF ACCOMMODATION. The upper limits represent the near points of accommodation as indicated by the blurring of small letters. The lower limits represent the distance at which each successive push-up was started.

The fixation target consisted of a photographically reduced Snellen chart transilluminated so that the letters were opaque on a translucent white ground.

The subject fixated the smallest letters that he could read when the target was at the far end of the optical bench (32 cm. from the spectacle plane) and was instructed to report whenever the letters became definitely blurred. The target was moved by means of a hand-operated crank, and its speed at any moment was that which seemed to elicit the greatest effort of accommodation.

Figures 1 and 2 are tracings of original records.

(4) Sustained effort. In this technique the test object is slowly brought toward the eye until it blurs, then slowly returned until just clear, and so continued until no increase in amplitude is obtained. Ergographic records[10] of the results obtained by this method have shown it to elicit higher amplitudes than any other technique. A typical ergographic record is shown in Fig. 2.

A theoretical explanation of the typical increase in amplitude in this method is offered by Lancaster and Williams.[11] They suggest that the prolonged contraction of the ciliary muscle with the resultant loss of tension on the suspensory ligaments permits the crystalline lens to gradually assume a more convex shape than it had when the muscle first contracted. They believe the viscosity of the lens to be such that its most convex shape is not obtained until after the tension on the suspensory ligaments has been released for some time. The increase in convexity is then evidenced by the ability to bring the test target nearer the eye.

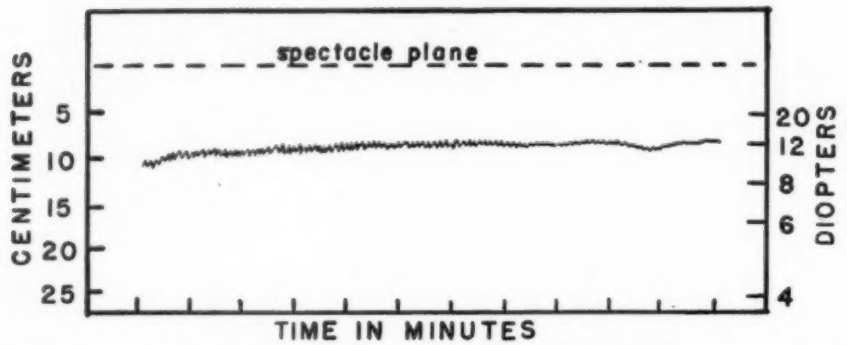

Fig. 2. ERGOGRAPH RECORD OF ACCOMMODATION. The upper limits represent the near points of accommodation as indicated by the blurring of small letters. The lower limits represent the distances at which the same letters became clear. The steady increase during the first few minutes is typical of the sustained-effort records.

Any increase in amplitude obtained by the sustained effort technique can only indicate at this time that the lens is capable of accommodating to that extent, but an actual diagnosis of whether the fault lies in the musculature or in the lenticular mechanism can hardly be made without further investigation.

If the low amplitude is the result of the underdevelopment of the ciliary muscles, a gradual increase in amplitude should be expected for some time after the refracting error has been corrected or while the eyes are being subjected to a prolonged series of accommodative exercises. A conclusive study of this phase of the problem has not been made, however.

If repeated push-ups show a gradual recession of the near points of accommodation, it is of course obvious that a lowered amplitude finding might be the result of a fatigue. A valid finding could be obtained in that case only at a time when all possible sources of preceding fatigue have been eliminated.

On the other hand, if repeated push-ups are continued over a period of about 15 minutes without a decrease in amplitude, it is probable that excessive near work is not a factor in producing the lowered amplitude.

If a ciliary hypertonicity is suspected, the procedure involved is an attempt to estimate the amount of the hypertonicity by the use of temporary plus lenses and prisms, a comparison of previous refractive records, and the use of a cycloplegic. When such an estimate is made, the amplitude finding can then be corrected to give the true amplitude.

The consideration of paralysis, peripheral involvements, toxic systemic conditions, respiratory deficiencies, etc., involve a careful case history and preliminary examination. The final and conclusive evidence is, of course, the return to a normal amplitude after the removal of remedying of the suspected cause.

ANALYSIS OF CASES IN WHICH THE AMPLITUDE FINDING IN ONLY ONE OF THE TWO EYES IS LOW

If either the repeated-effort push-up technique or the sustained-effort push-up technique elicits an increase in amplitude the case can be classified as one in which the other eye alone had previously enabled the patient to control his accommodation. The eye with the low amplitude in this case had been accommodating under ordinary conditions of seeing only because the two eyes are innervated equally and simultaneously. Thus the deviating or amblyopic eye of a squinter continues to accommodate just as does the good eye, but the facility of control of accommodation is temporarily lost when the stimulus to accommodation is presented monocularly to the eye in question.

If none of the monocular push-up tests can elicit a normal amplitude, the actual accommodative ability of the eye may be measured by means of a skiascope. In this test a skiascopic measurement of the state of refraction of the supposedly deficient eye may be made for various amounts of stimulus to accommodation supplied to the normal eye. Thus it may be seen whether the deficient eye actually fails to accommodate with the other, or whether, when tested monocularly, it simply fails to respond to a stimulus. An illustration of this principle may be seen in Fig. 3. In this subject the amplitude of the left eye tested by the various means was extremely low, while the subject's right eye showed almost a normal amplitude. The graph shows that although the left eye appeared to have little ability to accommodate when tested by itself, it actually did accommodate normally and to an amount equal to the accommodation of the right eye when the right eye was stimulated. Thus the monocular push-up test was not a measure of the ability of the left eye to accommodate.

If the tested eye fails to accommodate to an amount equal to the accommodation of the fixating eye, a paralysis or peripheral involvement should then be considered.

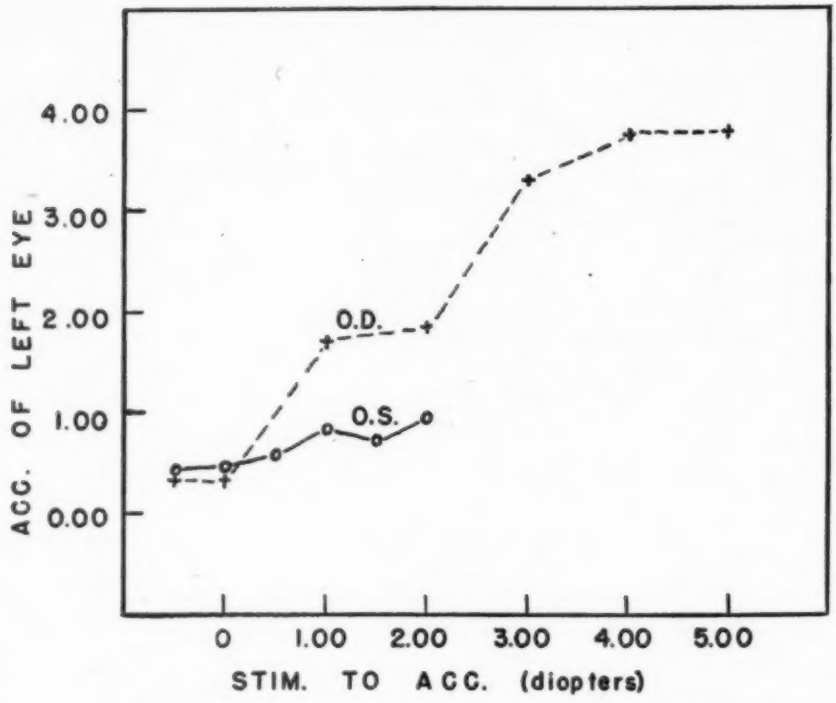

Fig. 3. ACCOMMODATIVE RESPONSE OF THE LEFT EYE TO MONOCULAR STIMULUS. The circles show the accommodation in play when the left eye itself was stimulated. The crosses show the accommodation in play when the opposite (right eye) was stimulated.

For the O.D. curve a Badel optometer is mounted on the right arm of a mirror haploscope to provide the stimulus to accommodation. A device on the left arm of the haploscope projects two narrow beams of light through the pupil of the subject's left eye. The front end of the device has a black surface with a narrow vertical slit at its center. The light from the upper half of the slit forms a narrow beam which passes through the temporal side of the pupil and the light from the lower half of the slit forms a second narrow beam which passes through the nasal side of the pupil.

When the vertical slit appears unbroken it lies at the conjugate focus of the retina and the dioptric value of the accommodation in play can be read on a scale. Since the lateral separation of the two narrow beams of light at the pupil remains fixed at two mm. regardless of the distance of the slit from the eye, the size of the pupil has no effect on the accommodation reading. The reading represents a measure of the accommodation in the horizontal meridian only. The arms of the haploscope are adjustable so that the slit and the stimulus target can be seen superimposed.

For the O.S. curve a half-silvered mirror before the left eye was employed to superimpose the image of the slit reflected by the mirror and the optometer target seen through the mirror. The right eye was occluded.

Similar results can be obtained by measuring the accommodation of the left eye with a skiascope while each eye in turn fixates and keeps clear a target seen through various strengths of concave lenses.

COMPARISON OF AMPLITUDES OBTAINED CLINICALLY AND ERGOGRAPHICALLY

The clinic examinations of the patients used in this study were made by students at the Ohio State School of Optometry. The patients were referred for further investigation whenever the student considered the amplitude finding abnormally low for the age. The student's findings were recorded as the clinical amplitude.

Table 1

Showing relation of amplitudes found in routine examinations to those obtained on the ergograph.

No.	Name	Clinic Amp. O.D.	Clinic Amp. O.S.	Eye	1st Push-Up	Subsequent Amplitude
1	L.A.	5.25	5.00	O.D.	4.50	6.00
2	G.I.	3.75	2.50	O.S.	3.25	6.75
				O.D.	4.50	5.50
3	J.K.	7.00	7.00	O.D.	6.75	7.75
4	A.S.	2.50	4.25	O.D.	11.00	14.25
5	E.S.	3.75	3.50	O.D.	6.25	6.25
6	W.R.	1.00	10.00	O.D.	4.25	14.25
7	C.M.	7.00	8.00	O.S.	8.00	13.25
8	J.M.	5.50	5.50	O.D.	7.75	7.75
9	E.M.	6.00	6.00	O.D.	4.00	8.00
10	H.K.	6.00	6.00	O.D.	12.50	20.00
11	P.K.	7.00	7.00	O.D.	4.50	8.00
12	J.L.	6.50	6.50	O.D.	14.25	14.25
13	R.G.	3.50	3.25	O.D.	10.00	10.00
14	A.H.	6.25	6.00	O.D.	8.00	12.50
15	E.H.	3.25	5.50	O.D.	8.00	11.00
16	D.H.	5.50	4.25	O.D.	7.00	11.75
17	W.F.	7.00	3.50	O.S.	6.75	10.00
18	A.F.	4.00	4.00	O.D.	8.25	14.25
19	J.B.	6.00	6.75	O.D.	10.50	10.00
20	E.D.	4.25	4.00	O.D.	7.75	12.50
21	J.L.	4.75	4.75	O.D.	5.25	8.75
22	P.R.	5.75	5.75	O.D.	12.50	13.25
23	D.S.	4.75	5.00	O.D.	8.00	9.00
24	N.S.	4.50	4.75	O.D.	8.25	15.50
25	B.H.	4.25	4.25	O.D.	8.00	10.50
26	N.H.	3.50	3.50	O.D.	8.00	10.50
27	M.W.	7.00	6.25	O.D.	7.00	9.00
28	D.C.	2.75	2.25	O.D.	6.75	10.00
29	J.N.	6.75	6.00	O.D.	7.50	9.50
30	G.H.	4.50	4.50	O.D.	6.75	10.00

The eye column indicates the eye used in the ergograph test. The 1st Push-Up is the first amplitude obtained on the erogograph. The Subsequent Amplitude is the maximum amplitude obtained. All measurements are in diopters.

In Table I may be seen the ergograph results obtained from 30 patients, all of whom were submitted to an ergograph test because of the low amplitude found in the clinic.

These data serve only to illustrate that further information than that gained from a routine examination must be made before a low amplitude finding can be considered sufficiently valid for a diagnosis.

Of the thirty low amplitude cases, fifteen showed a normally expected amplitude with the first or second push-up of the ergograph target, and twelve more were found to possess a normal amplitude after a few minutes of training. The remaining three showed greater amplitudes with the ergograph than in the clinic but did not attain the expected for the age. Subsequent training periods for one of these three quickly brought his amplitude to normal. The other two were not given further training.

Thus it would seem that an essentially low amplitude of accommodation is rare, and that clinically found amplitudes are more likely affected by such factors as the degree of adequacy of the stimulus to accommodation, the fatigue already present at the time the amplitude is measured in a routine examination, and the facility with which one is able to control his accommodative mechanism.

CORRECTIVE PROCEDURE

The corrective procedure in each case of low amplitude follows rather simply once the etiology has been ascertained. If the etiology is of systemic or environmental origin, the procedure is that of providing the patient with proper advice or instructions, or, in the case of an infection, it is that of removing or treating the infected organ. A corrective program in case of paralysis and peripheral involvements is extremely variable depending upon the severity and nature of the condition and the attending circumstances. Such a program may include temporary occlusion of one eye, change of visual habits and tasks, medical or surgical care, accommodative training, and, in some instances, simply the postponement of any attempt at correction.

If the low amplitude has all the characteristics of being essentially low and is not the result of any removable cause, such as in presbyopia, the most acceptable correction is an add for near work. In the case of hypertonicity, of course, the objective is the proper relaxation of the ciliary tonus. If the amplitude is of an undeveloped type, it may be

effective to give exercises or to prescribe exercising corrections as one would prescribe calisthenics. If the low amplitude is only the lack of facility of control of accommodation, the problem is usually solved by the time the proper diagnosis is made.

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EMOTIONS AND THEIR EFFECT ON BODY FUNCTION*

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For the last decade I have emphasized to the men in the ocular field the tremendous role the emotions play in the disturbance of the visual phenomena.

During this period and even longer other investigators have proven that the emotions definitely affected all body function. Almost monthly one reads in scientific publications further substantiation of this fact by the investigations of men in practically every field of science. The skepticism of the past by the general professional man could easily be understood because practically all investigations of the subject were made by psychiatrists or psychologists, who were suspected of being prejudiced, but most of their findings since have been substantiated by recognized investigators outside of psychology, therefore it is surprising to me that so few men in our field have given the proper recognition to this fact.

Just recently Dr. Walter B. Cannon, professor of physiology at Harvard University, and who has devoted nearly half a century to the study of the physical effects of the emotions, addressing the Reed-Russell Society of the George Washington University, Washington, D. C., had this to say, "Such emotions as fear and rage have profound effects upon the body, largely because the effects on the sympathetic nervous system release adrenalin, incredibly powerful secretion of the adrenal glands, into the blood stream. The superficial effects are well known; pallor, cold sweat, increased breathing and faster heart beat. But the primary effects," Dr. Cannon said, "are the deeper seated physiological mechanisms.

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"The emotions inhibit digestion, increase the amount of sugar in the blood, cause expansion of the bronchial tubes, quicker clotting of the blood, more resistance of muscles to fatigue and quicker recovery time. All these effects also can be produced by injections of adrenalin.

"All of them," Dr. Cannon said, "are reactions tending to increase the efficiency of the organism in the face of an emergency. They are entirely subconscious and outside the control of the will." He told of cases where men have obtained relief from asthma through a sudden fright which opened the bronchial tubes and from a blood sugar deficiency through a fit of rage.

"All these reactions are mediated through a small area of nerve tissue which lies under the cerebral cortex of the brain and which is entirely outside the domain of consciousness. It is the remnant of an 'old brain' whose function was to preserve life by instinctual reactions and which asserts its supremacy in emergencies over the portions of the brain concerned with intelligent or willed action.

"Not infrequently, the two 'brains' come into conflict—the intelligence trying to inhibit the instinctual reactions. The development of intelligent control of behavior, is largely a result of education which progresses throughout life."

Dr. John I. Lacey reported his experiments which were conducted in the department of psychology at Cornell University, and he found that the emotions always affected eyesight. He said that the ability to detect the difference in intensity of two small circles of light became less as the emotions mounted. He suggested that automobile drivers might find it useful to remember this experiment and try to control strong emotions while night driving. Dr. Lacey attributed this visual failure to tremor in eye muscles interfering with the eye's ability to accommodate and converge.

In the last two decades increasing attention has been paid to the role of the emotions as a cause of body dysfunction. This is a revival of old views in a new and scientific form.

Once the healing methods, whether mental or physical, were united in one hand. Whatever the explanation of the healing power of the medicine man or of the evangelist might be, they often had a spectacular curative effect upon the sick. The fundamental principle of modern medicine is that the body and its function can be understood in terms of

physical chemistry, that living organisms are machines and the ideal of the physician is to become an engineer of the body.

No one was more responsible for this concept in medicine than Virchow to whom pathology owes more than to anyone else. He declared that there are no general diseases, only diseases of the organs and of the cells. The search for the causes of diseases long remained limited to attempts to discover local pathological changes in the tissue. The concept that such local anatomical changes might be results of more general disturbances such as faulty functioning, overstress or even emotional disturbances, had to be discovered later.

It was left to the most neglected branch of medicine, psychiatry, to introduce a new aspect. For a long time psychiatry was concerned with the mentally diseased, a field in which the usually accepted methods of medicine proved to be much less productive than in all other fields. Psychiatry had to deal with delusions, hallucinations and the disturbances of the emotional life. These symptoms did not even permit a description in the usual terms of medicine.

Since the functions of the mind could roughly be connected with brain functions, the interest turned toward the study of the brain tissue. Unfortunately, in most cases of even severe mental disturbances no constant pathological changes could be discovered in the brain. The next step toward the resolution of the mysteries of the mind came from another source, from the psychoanalysis of Sigmund Freud.

The severe cases, the psychotics, were considered generally beyond medical aid. Being often apathetic, and deeply submerged in their ailment, they did not rebel against this disregard of their needs. But the even vaster group of milder cases, the psychoneurotics, who constitute probably the majority of all human sufferers, wanted help. The doctor forced to listen to psychological complaints of these patients, was unable to understand and to handle these symptoms with his physio-chemical laboratory equipment and began to dislike the neurotic patient. In order to hide his ignorance he refused to consider them as really sick and accused them of malingering.

The hysterical patient played a cruel joke on his doctor. He developed nervous symptoms which seemingly did not follow the laws of anatomy and physiology. He developed bodily symptoms which did not correspond to the distribution of the nerves.

This was the situation in which the young Freud, influenced by Charcot's hypnosis experiments, decided to earn his living by giving real help to the psychoneurotics. For this purpose he felt he must understand the nature of the neuroses. The results of this endeavor were a new contribution to the knowledge of man.

As soon as medicine turned toward the problem of the mind, the old attitude had to be abandoned. The fact that the organism is an intelligibly coordinated unit is strikingly expressed in what we call personality. Psychoanalysis consists in the precise detailed study of the development and functions of the personality.

Psychoanalysis, however, was not the only result of the movement. This new trend can also be clearly observed in non-medical psychology.

Probably the most important accomplishment of some of the psychologists has been the clear formulation of the idea that the whole is not the sum total of its parts but something different from them and that from the study of the parts alone the whole system never can be understood. The opposite is also true, the parts can be thoroughly understood only after the meaning of the whole has been discovered.

In the healing arts, a similar development took place. The advances in the field of neurology paved the way for a more comprehensive understanding of the relationships between the parts of the body. It became more and more evident that all parts of the body are directly or indirectly connected with a central governing system.

Another stimulus for this point of view came from the discovery of the ductless glands, which can also be considered as a central regulating system similar to that of the nervous system.

The fact that the mind rules over the body, no matter how much it was neglected by biology and medicine, is the most fundamental fact which we know about the process of life. From the moment when we awaken every morning on, our whole life consists in carrying out voluntary movements aimed at the realization of certain ideas, wishes, the satisfaction of subjective feelings such as thirst and hunger.

We express all of our emotions by physiological processes, sorrow by weeping; amusement, by laughing; and shame, by blushing. All emotions are accompanied by physiological changes, fear by heart palpitation; anger by increased heart activity and elevation of blood pressure and a change in carbohydrate metabolism; despair by a deep inspiration

and expiration called sighing. All these physiological phenomena are the results of complex muscular interaction under the influence of nervous impulses.

The fact that acute emotions have an influence on body functions belongs to the most common everyday experiences. These changes in the body as reactions to acute emotions are of a passing nature. After the emotion disappears the corresponding physiological processes, weeping or laughing or heart palpitation, or elevation of blood pressure, etc., also disappear and the body again returns to its equilibrium, and here we may have one of the reasons why our patients complain of visual disturbances during a particular period, and after a careful examination we find that there is a refractive error, or a disturbance of the accommodative-convergence relationship, usually a minor one and we proceed to correct same and patient may experience relief and then within an apparently short time patient will report that his eyes are now very comfortable and that he does not need the aid of his glasses any longer. Usually these patients are using their eyes in the very same manner that they did when we first examined them. I have examined a number of such patients after they reported complete comfort without their glasses and have found the same refractive condition, but after very carefully inquiring of just what their personal experiences have been all during that period, the majority of them reported some emotional disturbance.

The study of neurotic patients reveals, however, that under the influence of permanent emotional disturbances, chronic disturbances of the body may develop. At first such chronic bodily changes under the influence of emotion were observed in hysterical patients. These changes were first observed in the muscles controlled by the will and in the field of sense perceptions. One of the most important discoveries of Freud was that whenever emotion cannot be expressed and relieved through normal channels through voluntary activity, they may become the source of chronic psychic or physical disorders.

Also emotionally caused disturbances of organs which are not controlled by conscious voluntary impulses, such as the stomach or the heart, have been observed. Such observations led to the concept of "organ neurosis." These are disturbances of the internal vegetative organs caused by nerve impulses, the ultimate origin of which is emotional processes most probably localized in the brain.

Another term often used for this type of disorders is "functional

disturbance," referring to the fact that the study of the tissues does not reveal any physical changes discernible by the microscope. In such cases the anatomical structure of the organ is not changed. Such disturbances are considered as less serious because they are reversible, in contrast to those diseases in which the tissues show definite pathological changes.

Gradually it became more and more evident that nature does not know such strict distinctions as "functional" versus "organic". More and more clinicians began to suspect that functional disorders of long duration gradually may lead to serious genuine organic disorders based on visible anatomical changes. A few instances of this kind have been known for a long time, for example that the hyperactivity of the heart may lead to overdevelopment of the heart muscles or that the hysterical paralysis of a limb may lead to degenerative changes in the muscles. One had to reckon therefore with the possibility that a functional disturbance of long duration of any organ may lead finally to definite anatomical changes and to severe organic illness. Studies of peptic ulcers brought weighty evidence for the assumption that emotional conflicts of long duration may lead as a first step to a stomach neurosis which in time may result in an ulcer. There are also indications that emotional conflicts of another kind may cause continued fluctuations of the blood pressure which constitutes an overtaxation of the vascular system. This functional phase of fluctuating blood pressure in time may cause organic changes in the circulatory system.

These disorders develop in two phases. The first phase consists of a functional disturbance of an organ, caused by a chronic emotional disturbance. In the second phase the chronic functional disturbance leads in time gradually to irreversible tissue changes, to an organic disease.

Formerly in medicine, the symptoms of the disease were explained as the result of pathological tissue changes which could be traced back to external mechanical, chemical or bacterial causes, or the natural aging process. The significance of the new concepts consists in the demonstration of a fundamentally different cause of disease.

At present it is difficult to foresee what types of diseases follow this scheme. Some types of peptic ulcers and of high blood pressure probably belong to this group. It is probable that many glandular disturbances will turn out to be the results of chronic emotional disturbances. This is clearly indicated in cases of toxic goiter, the beginning of which often can be traced back to emotional shocks. Furthermore the influence of

emotions on carbohydrate metabolism makes it possible that in the development of diabetes emotional factors may play an important role.

All those emotional conflicts which psychoanalysis has recognized as the ultimate cause of certain fundamental and organic disorders, arise during our daily life. Continuous fears, aggressions, wishes, if repressed, result in permanent chronic emotional tensions, which disturb the functions of the organs not under conscious nervous control. Many emotions due to the complications of our social life, cannot be freely expressed and relieved, but remain repressed and then are diverted into wrong channels. They influence the internal functions, such as digestion, respiration, circulation, etc.

There is much evidence to show that just as bacteria have a specific affinity for certain organs so also the emotional conflicts differ from each other and afflict different organs. Inhibited rage seems to have a specific relationship to the heart and circulatory system, and I think it would be of a special interest to optometrists to read more about this phenomena which Dr. Menninger so brilliantly termed "Man Against Himself."

It becomes increasingly evident that some of the destruction which curses mankind is self-destruction. This attack of the human being upon his own existence is one of the most remarkable of biological phenomena.

If an investigator looked closely into the lives of individuals and communities he would see bickering, hatreds, and fighting, useless waste and petty destructiveness. He would see people sacrificing themselves to injure others. And most amazing of all, he would see some who, as if lacking aught else to destroy, turn their weapons upon themselves.

It was such observations as this that led to the formulation by Sigmund Freud of the theory of a death-instinct. According to this concept, there exist from the beginning in all of us strong propensities toward self-destruction and these come to fruition as actual suicide only in exceptional cases where many circumstances and factors combine to make it possible.

Freud makes the further assumption that the life- and death-instincts —let us call them the constructive and destructive tendencies of the personality—are in constant conflict and interaction just as are similar forces in physics, chemistry, and biology. To create and to destroy, to build up and to tear down, these are the two directions in which the same energies exert themselves.

When a weasel or a mink gnaws off its own leg to escape from a trap it does so, so far as we can judge, consciously and deliberately and accepts, so to speak, the full responsibility for the self-preservative self-destruction. Some human individuals who are forced to similar sacrifices also accept the responsibility and defend their action with such logical reasons as they can command, sometimes correct, often fallacious.

In other cases the individual accepts the responsibility for the self-destruction unwillingly and only in part, and makes no attempt to explain it, so that the act seems purposeless, as for example the slow ruin of a life by chronic alcoholism or morphinism.

Still others can be recognized in which no responsibility for the self-destruction is accepted; the responsibility is projected upon Fate, enmity or circumstance; one sees this in some so-called accidents, which are frequently unconsciously intentional in their nature.

During the last twenty-four minutes somewhere in the United States a man has killed himself. It happens about sixty times a day, every day; 22,000 times a year. This is only in the United States; it is twice as frequent in some European countries. It is everywhere more frequent than murder.

In the popular mind suicide is the simple and logical consequence of ill health, discouragement, financial reverses, humiliation, frustration, or unrequited love. What amazes one most, is not that these simple explanations are continually offered but that they are so readily and unquestioningly accepted.

This conception of self-destruction as a flight from reality, from ill-health, disgrace, poverty, or the like is seductive because of its simplicity. It parallels other escapes such as the taking of vacations or celebrating of holidays.

But there is an essential difference between these escapes which are all temporary, and suicide. The human mind cannot conceive of non-existence, and hence, the suicide's act betrays his belief in some kind of a future life more endurable than this present life.

The popular analysis would be more nearly correct, therefore, if it were phrased that suicide is an attempted escape from an intolerable life situation.

A wealthy man one day kills himself. It is discovered that his investments have failed, but that his death provides bountiful insurance for

his otherwise destitute family. The problem and its solution seem simple enough.

But why should we begin our interpretations only at this late point in such a man's life. Shall we not inquire how he made his wealth, why he was so driven to amass money and what means he used to gratify his compulsion, what unconscious and perhaps also conscious guilty feelings were associated with it and with the sacrifices and penalties its acquisition cost him and his family? And even those who have money and lose it do not in the vast majority of cases kill themselves. The problem becomes difficult and complex.

In contrast to the sudden, acute manifestations of self-destruction represented by the act of suicide, those forms of self-destruction in which the individual commits slow suicide—suicide by inches as it were—could, I think, be called chronic suicide, or chronic self-destruction.

Asceticism, for example, with its varied and ingenious devices for prolonging existence for the purpose of enduring more deprivation, is the very refinement of slow death. Many instances of long neurotic invalidism also fall into this category of inhibited forms of suicide, the patient often appearing to cling tenaciously to a life that seems not worth the living. Alcoholic addiction is a somewhat more robust way of achieving self-destruction. Then there are other forms of chronic suicide which are more dramatic, such as martyrdom and so-called "chronic bad luck," in which the individual, perhaps by provocative means, instigates his own destruction and bears it nobly.

There is a fundamental difference between chronic suicide and "acute" suicide. In the former the individual postpones death indefinitely, at a cost of suffering—a "living death," it is true, but nevertheless living. In such persons, however, the destructive urge is often of a progressive nature, requiring larger and larger payments until finally the individual is, as it were, bankrupted and must surrender to actual death.

It is apparent that the ascetic destroys himself to a greater or less degree by his self-imposed rigors. It is more difficult to discern that martyrdom is self-destruction. It appears, that the martyr's punishment is incidental and unsought, and perhaps in many instances this is true. In other instances it appears to be voluntarily (although usually unconsciously) sought.

The heroic sacrifices of scientists who willingly incur the fatal

risks incident to research, patriots who lay down their lives for freedom, saints of the church and other persons who give their lives for society, or for those they love, are usually not considered suicidal, because the social usefulness of the course chosen—the element of creativeness—denotes the victory of the constructive rather than the destructive elements in the person's nature. The individual may have wished to destroy himself or he may not—but if the social or reality value of his sacrifice is predominant, therein lies the evidence that the self-destructive forces were not triumphant.

All of us to some extent indulge in self-destruction under the guise of martyrdom. The employee who is successfully promoted only to throw away his chances for the final and ultimate promotion toward which he would seem to have been striving, by what sometimes appears to be studied carelessness or even intentional neglect; the man who after steady progress and every indication of great future promise suddenly changes tack and veers off into what everyone considers to be a less fruitful direction; the man who without adequate justification suddenly becomes discouraged, throws up his hands, and resigns to the dismay of all of his well-wishers; the man who achieves a notable success only to nullify its benefits and the status of his own reputation by a series of acts calculated to inspire precisely the contrary attitudes in those about him—these and many other examples will come to mind.

The majority of people do not recognize that the average individual's conscience does not correspond in its standards to the world of reality, being far more rigid and less amenable to reason. In the realm of the unconscious, fantasies of crime are as heavily weighted with guilt as actual crimes and must be punished. Even instinctual impulses, innocent in themselves, may be the source of agonies of remorse.

According to the psychoanalytic theory, self-condemnation and self-criticism are reflections of parental attitudes and functions incorporated by the child early in life and used as a guide for all his future conduct.

We know how some individuals capitalize any illness and distort its importance and seriousness; the greater susceptibility of such individuals to sickness is also well known. In chronic invalidism we have a conflict between the wish to live and the wish to die. Sometimes this is evident in the conscious productions of such patients; they say frankly that they "would rather be dead than go on suffering this way." The

fact is that chronic invalids of this type seldom die young, and despite frequent threats of suicide, rarely resort to it.

The extraordinary fact that a person should enjoy suffering or should prefer pain to pleasure cannot be easily explained. It can be understood only when one sees that the visible sufferings are far less than the invisible sufferings of such a person, or rather the invisible fears of suffering. For some individuals it is better to be pitied than to be ignored. For such individuals love is obtainable only in the form of pity.

But there are only general principles and they understress the fact that such a bargain, such a compromise involves a terrific price, a costly sacrifice, the sacrifice of a considerable portion of the personality.

Alcohol addiction can be thought of not as a disease, but as a flight from disease, a disastrous attempt at the self-cure of an unseen inner conflict aggravated but not primarily caused by external conflict. It is literally true that the alcoholic addict does not know why he drinks.

Alcoholic addicts are almost invariably jolly, sociable, talkative fellows who make themselves very popular, who indeed seem obliged to make themselves well liked and are very skillful at doing so. This inordinate wish to be loved which compels them to be charming and to win popularity bespeaks a great underlying feeling of insecurity.

Neurotic self-destruction is quite similar to alcoholism except that the individual ruins himself by inexpedient conduct instead of by drinking. Such individuals always fail. If, for example, they pursue the career of crime, their crimes are stupidly executed, they seem to rush to be arrested and seem to invite punishment. If, on the other hand, they seek some more worthy attainment, they skillfully manage to bring it to catastrophe time after time.

Sometimes instead of blustering, fighting, and trouble-making, the individual accomplished his aggressions and his self-destruction by a more passive technique. Passivity can be just as provocative as active aggression. In fact, perhaps those who exasperate their associates by laziness, indifference, and ineptitude are more numerous even if less conspicuous than those of the type illustrated above.

It is difficult to realize that such individuals live and breathe and carry on business relations without being generally regarded by their friends and neighbors as self-destructive, even when things come to a

climax. They may be accused of stupidity, or knavery, or of courting bad luck.

Let it not be thought that in the wild joys for which he pays so dearly the neurotic character gets his heart's desire—and is, therefore, to be envied, not pitied. Reality cannot be flouted with impunity.

There is a self-destructive activity which is concentrated upon the body, and usually upon a limited part of the body. Certain phenomena familiar to all physicians belong in this category. I have in mind particularly self-mutilation, malingering, compulsive polysurgery, and certain unconsciously purposive accidents resulting in local injury.

By self-mutilations I refer to deliberate destructive attacks upon various parts of the body. In the same category, also, we cannot omit the various forms of self-inflicted bodily injury to which neurotics are addicted. Biting the finger nails, for example, is a degree short of biting the fingers, and some individuals have a compulsion to bite themselves more or less severely in various other parts of the body. Others scratch and dig at their flesh incessantly, pluck out their hair or rub their eyes or skin.

By polysurgery I refer to those persons who seem addicted to surgical operations, who successively develop conditions which make it seem necessary that an operation be performed.

By purposive accidents I refer to those occurrences in everyday life by which the body suffers damage as a result of circumstances which appear to be entirely accidental. In certain instances, these accidents can be shown to fulfill specifically the unconscious tendencies of the victim.

Automobile accidents often occur under circumstances which are suspiciously indicative of at least unconscious intent. We sometimes say of a man who drives his car recklessly that "he must want to kill himself."

Not only automobile drivers but pedestrians as well often show that they are dominated by a wish to destroy themselves.

According to the National Safety Council "Approximately 340,000 times every year pedestrians using the streets and highways of the United States find themselves 'walking into trouble.' That is the number of injuries annually which result from motor vehicle-pedestrian collisions." Over 16,000 of these proved fatal.

We are sure that some of these 16,000 deaths were the fault of the victim. After all, to be careless with one's own life is in itself a symptom directly related to the self-destructive impulse.

If unconscious purposes are found to lie back of the impulse to gouge out one's eyes or cut off one's ear, may it not be possible that the same purposes sometimes find expression in diseases which attack the eye or the ear?

All doctors know and agree that paralysis, tremor, swelling, pain, cramps, and other "functional" symptoms may appear in all parts of the body and be directly related to psychological factors. Such symptoms are technically designated hysterical but they do not involve structural changes in the body. For example, all doctors are familiar with hysterical blindness. The patient cannot see, although examination of his eye reveals no detectable structural disease.

These "hysterical" lesions sometimes become chronic and structuralized, actual visible tissue-destructive lesions can be and have been produced by suggestion, i. e., as the result of ideas alone. Study of the personality often shows that the "organic" disease is only a part of the total personality disease and fits into a pattern which seems to have the definite purpose of destroying the self.

It would appear that these unconscious self-destructive tendencies at one time are manifested through conscious expression and at other times through unconscious attacks on the organs. Sometimes there is a joint expression of both. It is only occasionally and with difficulty that we are able to show the relationship between these. Theoretically this remains the task and the opportunity of psychoanalysis, viz., to identify and relate specifically the emotional factors contributing to physical disease.

Fundamentally all branches of the healing profession are based on sympathy, the feeling of common humanity. In our work our first duty is in diagnosis—to accept and treat man not as a thing but as a living person with due appreciation for his mind and environment. The visual function in man, being of such a complex psycho-physiological nature is especially susceptible to mental and emotional maladjustment. Good and comfortable vision must not fall short of the ideal of a healthy body and a wholesome mind.

DISCUSSION

DR. RICHARD M. HALL, CLEVELAND, OHIO: For years a large per cent of our scientists, medical and otherwise, have closed their eyes to Freudian psychology. Freud was ostracized from his own profession because of his work. However, today, we see them coming back to Freudianism because it is the only true application of the term that we know as psychology as it is left today. We have experimental psychologists and psychologists in other fields. However Freudianism is the only field in which they have any close relationship to the human problems as reviewed in the paper presented by Dr. Kraskin.

If you have any doubts you might experiment along that line for your own interest and information. I would suggest to you if you are interested particularly in Dr. Kraskin's work, and I know you are and you want to familiarize yourself with the subject, to get first of all the book *Architects of Ideas*. It is a very novel study which has been developed by Dr. Harry Trattner. It is a biological sketch of all the major ideas which have come to us in the last one-hundred years. You will find in that book a biographical sketch of Freud and what is meant by Freudianism.

Also, if you are interested in the practical applications of this subject and you have any question in your mind as to its authenticity, subscribe to the TRANSACTIONS OF THE PSYCHO-ANALYTICAL INSTITUTE, which is under the Rockefeller Foundation, located in the Erie Building, in Chicago. It is conducted by Dr. Franz Alexander, who is ranked today as one of the outstanding Freudianists in the country. If you will take those two works and study them carefully, they may help you to gather a greater conception of what this particular subject and science means to all of us.

Furthermore, if you want some very practical application of the principles involved in this particular work, you can write to the Psychological Laboratories, at Randolph Field. The Medical Department, Army Air Corps, has devised and developed a whole battery of psychological tests, trying to determine many of the factors that Dr. Kraskin has given to you this afternoon.

We may laugh at some of the things which have been brought out, but the medical profession is definitely interested in the whole problem and particularly so when we speak of it in terms of the use of the eyes in flying. The work that is being carried on at the present time at the Psychological Laboratories at Randolph Field will interest you.

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A PROPER DEFINITION FOR THE SCOPE OF OPTOMETRIC PRACTICE

Attempts have been made from time to time to define, in easily understandable terms, the technical scope of the practice of optometry. Some of the definitions presented have been good and have been incorporated into the various regulatory optometric statutes in force in all of our 48 states. Other definitions, still in use, overlook certain aspects of our work while others are so loosely and badly worded as to actually mean but little.

The man in practice, to be sure, has but an academic interest in the matter if by chance he is interested at all. He knows his abilities and

confines his activities well within the borders of his professional sphere. On the other hand definitions which are understandable and which interpret properly a subject under consideration are of value. In fact from the standpoint of optometry, being as it is, a limited specialty in the health field, proper definition of its scope is essential as our profession touches rather closely the interests of several others and as intra-professional policies are laid down it is well for all to clearly understand what is meant when the term "optometry" is used, or what is inferred when an optometrist's work is being discussed.

In their excellent manual dealing with the factors involved in properly going about the business of accrediting optometric schools, Borish and Freeman[1] present material which may well be considered whenever the subject of defining the scope of optometry is brought up. Approaching the subject from the present educational standpoint these men have unintentionally, perhaps, developed a five part definition of the scope of optometry which covers all phases of the work of the optometrist as he practices today. Using their material, a new definition of optometric practice would read as follows:

The Scope of Optometry may be defined in general as: (1) The differentiation of non-pathological from pathological cases, whether local or systemic, and the referral of all pathological cases to a medical practitioner. (2) The determination, measurement, interpretation, and correction of the refractive conditions of the eye, by means of lenses, orthoptic treatments, or other devices. (3) The determination, measurement, interpretation, and treatment by means of orthoptics of those motor or visual anomalies of the eyes which can be reasonably expected to respond to such treatment, and the identification and referral to a medical practitioner of those cases which can not be aided exclusively by optometric techniques. (4) The recognition of the accessory factors other than refractive or oculomotor which may cause ocular discomfort, (example—improper illumination, poor reading habits, etc.) and the correction of the difficulties or the referral of the patient to the proper specialist. (5) The dissemination of the basic principles of ocular hygiene, and the participation in preventive and public health optometric activities.

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[1]Borish, I. M., and Freeman, E. Manual of Accrediting of Schools and Colleges of Optometry. Published by the Council on Education and Professional Guidance of the American Optometric Association. 1941.

It is a long definition. But it is a good one. It is all there. It covers the ground of our undergraduate courses in optometry and outlines the work the optometrist is expected to do well, when he is in practice. The Borish and Freeman definition leaves nothing to the imagination. It really defines the scope of optometry and should serve as a basis for present day definitions of our activities in the laws and governmental regulations surrounding our work. Carel C. Koch.

INQUIRY AND EXPLANATORY NOTES

Through this department answers to technical questions dealing with orthoptic or refractive problems will be presented. These answers here published have been prepared by competent experts. Inquiries on postal cards and anonymous communications will not be noticed.

ALKALOIDAL SALTS

To the Editor: Please describe briefly the important alkaloidal salts used as mydriatics and cycloplegics in ophthalmic work.

C. S., Los Angeles, Calif.

According to Preston[1] the pure alkaloids are only used for the preparation of ointments or oily solutions and not always then. It is a general characteristic of these bodies that they are soluble in ether, chloroform and similar organic solvents as well as in fats and oils, but that they are not soluble, or if soluble at all, only to a very slight extent in water. Alkaloids are capable of combining with acids to form salts, thus we get atropine sulphate, hyoscyamine, hydrobromide and so on. These salts are soluble in water and are therefore used in the preparation of aqueous solutions as well as solid preparations, where an aqueous solution forms one of the ingredients during the process. The salts are also used in the preparation of tablets, this, of course, is necessary as the tablet, when instilled into the eye, is required to dissolve in the tear fluid. When used in making ointments, the salts should be dissolved in the smallest quantity of water and the solution incorporated with the base.

Atropine Sulphate. This salt has the molecular formula $C_{34}H_{38}O_{10}$-

[1]Preston. A. J. Drugs used in refraction. Refractionist. (London.) 22.357.54.

N_2S, its molecular weight being 676·63. It is a compound of two molecules of atropine with one molecule of sulphuric acid, thus—$(C_{17}H_{23}NO_3)_2H_2SO_4$. The salt presents the appearance of a white micro-crystalline powder with a melting point of 189° to 190° C. It is not soluble in ether or chloroform but is soluble in water in the proportion of 2 to 1.

Applied to the eye it acts as a mydriatic and cycloplegic, paralyzing the involuntary muscles by its action on the autonomic nerve system, so that the pupil is dilated and rendered immobile and the power of accommodation is destroyed. The mydriatic action of the salt is so great that the instillation of one-millionth part of a gram will bring about dilatation. In very small infants, atropine produces little dilatation of the pupil, in fact cases of poisoning have been recorded with little or no mydriasis. In older children the action is very vigorous but when applied to the eyes of adults over forty years of age, the action is less intense than in youth. Mydriasis commences almost immediately, a marked dilatation occurring within a few minutes. Cycloplegia is delayed a little longer and is only complete when several applications have been made over a period of about three days. As would be expected, the more active the accommodation, the slower the cycloplegia. In presbyopes there is little power of accommodation, consequently cycloplegia is fairly rapid.

Homatropine. This is a synthetic alkaloid prepared from atropine. The natural alkaloid is dissolved in mandelic acid ($C_6H_5CH.(OH).COOH$) which converts atropine first to tropine and then to tropine mandelate. The solution of tropine mandelate thus obtained is heated for some days with dilute hydrochloric acid, which converts it to homatropine hydrochloride. The hydrochloride is decomposed by the addition of an alkali, the basic homatropine being precipitated; the precipitate is dissolved out in chloroform and purified by crystallization from alcohol. The molecular formula of the alkaloid is $C_{16}H_{21}NO_3$ and its molecular weight equals 275·256. In common with other alkaloids, homatropine is soluble in such organic solvents as ether, chloroform, oils, etc., but is sparingly soluble in water.

Homatropine Hydrobromide. This salt, which is obtained by dissolving the base in dilute hydrobromic acid, is easily the most popular of mydriatics. On re-crystallization from dilute alcohol, homatropine hydrobromide presents the appearance of a white, crystalline powder, without odor. The salt is soluble in water (1 in 6) and the solution is

neutral to litmus, it is slightly soluble (1 in 133) in absolute alcohol, insoluble in ether and almost insoluble in chloroform. The molecular formula is $C_{16}H_{22}O_3NBr.$, the molecular weight being 356·186.

As a mydriatic it is usually prepared in two strengths, viz. a weaker solution containing one quarter to one-half per cent and a stronger containing two per cent of the salt. The weaker solution is used when moderate dilatation of the pupil is required for ophthalmoscopic examination, one drop being sufficient to induce the necessary dilatation in about half an hour, without affecting the power of accommodation. The mydriatic is under some control and can be cut short by the instillation of eserine; on this account it is useful when dilatation of the pupil is required in patients above thirty or forty years of age. It is good practice to use a controllable mydriatic in patients of middle age, in case there is a predisposition to glaucoma.

The stronger solution is used in young subjects and in cases where it is required to break down some of the accommodation. The instillation of one drop of 2 per cent solution at intervals of about fifteen to twenty minutes, will bring about a complete mydriasis in about an hour and the power of accommodation will be affected to some variable extent. The effects of this stronger solution are not easily under control. So far as the work of the refractionist is concerned, however, an aqueous solution of the hydrobromide is vastly preferable to any other preparation of this valuable mydriatic. In addition to its use in ophthalmological work, homatropine has its uses in general medicine; its properties are similar to those of atropine but its action is inferior and less dependable than the action of the natural alkaloid, consequently it is not so widely used.

Besides the hydrobromide, homatropine hydrochloride, $C_{16}H_{21}NO_3HCl.$ and homatropine salicylate, $C_{16}H_{21}NO_3C_7H_6O_3$ are also prepared. These salts have properties similar to the hydrobromide; the hydrochloride is a stable salt, but the salicylate, in common with all salicylates, does not keep well, either in the dry state or in solution.

BOOK NOTICES AND REVIEWS

Books received are acknowledged by notices in this department. Special selections will be made for more extensive review in the interest of our readers as space permits.

THE PRACTICE OF FITTING CONTACT LENSES. William Feinbloom, Ph.D., O.D. Published by the Journal of the American Optometric Association. Wilmac Building, Minneapolis, Minn. 46 pages. Illustrated. Board Covers. $1.50. 1942.

Feinbloom presents the technique of fitting contact lenses. Each step of the procedure is reviewed in some detail. The material is presented in the form of a short course of study which will familiarize the optometrist with most of the basic principles involved in prescribing these aids to sub-normal vision. The text is well illustrated with original photographs.

This short work cannot take the place of clinical practice in this field, but represents a satisfactory background of reading to enable a practitioner to acquire further training in the fitting of contact lenses. The text is composed of material originally presented in a series of monthly articles which appeared during 1941 in the JOURNAL OF THE AMERICAN OPTOMETRIC ASSOCIATION. Carel C. Koch.

TABER'S CYCLOPEDIC MEDICAL DICTIONARY. Published by the F. A. Davis Company, 1914 Cherry Street, Philadelphia, Penna. Double Thumb Index. 1,488 pages. Illustrated. Cloth. $3.00. 1942.

This medical dictionary is especially written by a corps of fourteen medical and surgical specialists with the added advice of many consultants. Periodical literature is used freely in order that the work may contain the latest thoughts and discoveries of the medical profession.

More than 50,000 words, diseases, techniques and drugs are defined. All important diseases are given, including symptoms, diagnosis and prognosis. Words and terms used in anatomy, chemistry, bacteriology and other sciences are also included.

Pronunciation, capitalization and related subjects are also presented, as are the etymologies of the words. The definitions of the words themselves are clearly written in most cases by a complete sentence, in which

the use of scientific words which might require consultation to understand the definition have been avoided as much as possible.

Every undergraduate student and practicing optometrist should at all times have on hand an *up-to-date* dictionary. For both groups, Taber's dictionary will prove invaluable. It is complete and authoritative and will well serve the optometric profession as it does the medical.

Carl Olson.

THE THERAPEUTICS OF OCULAR REFRACTION. Brumer, V. 304 pages, 24 illustrations and figures, glossary and index; published by Victor Optical Company, Saint Helen's, Lancaster, England. Price, 21 shillings. 1942.

Brumer, in writing this book has doubtless been impressed with a certain complacency on the part of Optometry in England, and sets out to alter this situation. While his approach might be considered unorthodox, the fact remains that the book has much interest and is well worth the reader's time. There is no attempt to make this a text book. It is, rather, a discussion of one man's methods and his reasons for believing them to be right.

It is stated at the outset that the writer adheres to the philosophy of Donders and Helmholtz, believing that these men intended that ocular refraction have a separate niche in Public Service, emphasis is placed on what is termed critical refraction, or a complete understanding of the functions of accommodation and convergence. To quote Brumer, "The consequences of extensive and prolonged accommodation of the crystalline lens will be accounted for by nervous symptoms. Cosmetic alterations and nearly all pathological conditions to which the eye is exposed." Emphasis is likewise laid upon the fact that accommodation and convergence are responsible for many forms of ocular pathology. Special emphasis is placed upon static retinoscopy, careful measurements of accommodative amplitude and observance of strain about the eyes. One chapter is devoted to a philosophy of stepping up convex lens power and convergence aid with a number of general statements inspired by Donders.

Interesting are the chapters on neurosis and migraine, influence of ametropia and asthenopia on ocular disease, causation, prevention and

treatment of senile cataract. To support his philosophies of eye care, Brumer has presented 205 case records, all interesting, some meager, and certain which would be questionable for research or comparison values.

The optometrist will find in the appendix much that may interest him from a Public Health standpoint, because Brumer gives a most interesting brief of the experiences of the optometrists in England.

This book will be of special interest to the optometrists who wish to know how their friends in England practice.

R. H. Ehrenberg.

ABSTRACTS

A department in which will appear abstracts of the literature of optometry, ophthalmology and applied optics. These will be classified according to the following list, although contributions to all sections will not necessarily appear in each issue.

1. Ocular Refraction.
2. Physiological Optics and Color Vision.
3. Ocular Muscles.
4. Orthoptics and Reading.
5. Anatomy, Histology and Embryology.
6. Ocular and General Pathology.
7. Ophthalmic Lenses and Material.
8. Instruments.
9. Hygiene and Illumination.
10. Applied and Physical Optics.
11. Education, Sociology and Economics.
12. Miscellaneous.

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6. OCULAR AND GENERAL PATHOLOGY

CENTRAL RETINITIS IN A GIRL AGED EIGHTEEN YEARS. RECOVERY. Ford, R. British Journal of Ophthalmology, 1941, 25 (November), 521-523.

The prognosis in choroiditis is usually bad as regards the area affected and when this area is central, the resultant loss of central vision makes the outlook hopeless. "The aetiology is frequently uncertain, and while we are occupied with the often prolonged search for one of the multiple possibilities of septic foci which may be responsible, the damage is done." Ford reports the successful recovery of a case in which every investigation, medical, dental, nasal, X-Ray of the sinuses and the Wasserman was reported negative. Suspecting a possible hidden septic infection of the sinuses, drainage of the sinuses was promoted. Peroxide packs were placed in the nose for 20 minutes daily. The patient was also given three inhalations of Friar's balsam and took 6 grs. of pulv. aloes barb. daily. Improvement was rapid. Twenty-four days from the

first onset, vision was 6/6 in both eyes and only the pigmented area in each fundus remained as a permanent scar. Cure has been permanent for 7½ years. R. J. B.

TRAUMATIC CATARACT. Swann, L. A. Optician (London). 1941, 101, 2608, 95.

Cataracts which result after slight traumatism are briefly discussed by Swann, who points out that patients suffering from slight ocular injuries may find themselves with a traumatic cataract of a type which takes several months to fully develop. A case report of this kind is presented. C. C. K.

COMPLICATIONS OF CATARACT EXTRACTIONS. Elvin, N. C. Eye, Ear, Nose and Throat Monthly. 1941, 20, 10, 303-306.

The complications of cataract extraction are abrasion of the cornea, non-formation and hemorrhage into the anterior chamber, hemorrhage, incarceration and prolapse of the iris, secondary cataract, vitreous prolapse, dislocation of the lens, choroidal subretinal hemorrhage, detachment of the choroid, a filtering cystoid cicatrics, intraocular infections, postoperative glaucoma, and cyanopsia. Facts pertaining to these various complications are considered and the management of the complications described. C. C. K.

A CASE OF BRAIN TUMOR. Eames, T. H. Columbia Optometrist. 1941, 15, 59, 3.

A case history covering a five-year period is presented of a patient suffering from a glioma. The full symptoms suffered by this case are given along with the refractive findings, visual acuity and phoria changes. Following the removal of the tumor the patient had an uneventful recovery, the eyes returning to normal. C. C. K.

RETINAL ASTHENOPIA. Swann, L. A. Optician (London). 1941, 102, 2640, 169.

"Conditions of ill health insufficiently serious to incapacitate may

bring a series of ocular symptoms which cannot be removed with optical measures. Subjective symptoms associated with defective or strained vision are classified under the heading of asthenopia. Asthenopia is divided into three classifications: refractive, muscular and retinal (or nervous asthenopia). Refractive and muscular asthenopia can usually be corrected with the appropriate refractive and muscular treatments. Retinal asthenopia occurs in low states of physical and mental health. It is likely to be encountered during war." T. O. B.

COLLATERAL AILMENTS IN REFRACTION. Robinson, S. H. Optometric Weekly. 1941, 32, 45, 1269-1270.

Collateral or associated eye disorders are discussed by Robinson. These are (1) sinusitis. (2) Metabolic problems, such as thyroid disorders. (3) Climacteric disturbances, such as puberty and especially the menopause, and (4) certain types of female disease. Robinson points out that ocular symptoms are frequently aggravated by these physical ailments and refractionists should be on guard to differentiate symptoms which are entirely ocular from those related to the foregoing abnormalities. L. P.

A PLEA FOR EARLY DIAGNOSIS IN GLAUCOMA. Atkinson, D. T. Eye, Ear, Nose and Throat Monthly. 1941, 20, 4, 105-107.

Suspect glaucoma in cases of (1) frequent changes of correction without relief from symptoms. (2) Decreased vision in cases of opacities in the lens where these opacities are either small or few in number. (3) Evidence of increased tension even though small in amount, and (4) where evidence of abnormal cupping of the disc is present. Atkinson advises that when in doubt, take fields of vision for both color and form, at once. C. C. K.

VITAMIN "B" COMPLEX DEFICIENCY AS A CAUSE OF RETROBULAR NEURITIS AND PERIPHERAL NEURITIS IN A CHRONIC ALCOHOLIC AND PIPE SMOKER. Gottlieb, B. British Journal of Ophthalmology. 1941. 25 (December), 556-564.

A case of retrobulbar neuritis and peripheral neuritis is described in

a chronic alcoholic and pipe smoker. Tobacco was of little or no importance in the etiology since, with vitamin B_1 treatment, the condition improved despite the continuation of tobacco. The literature is reviewed describing retrobulbar neuritis as occurring in association with other evidences of vitamin B complex deficiency. Alcoholic retrobulbar neuritis is considered to be due to vitamin B complex deficiency, probably vitamin B_1. Retrobulbar neuritis in pregnancy and some cases of retrobulbar neuritis in diabetes are probably due to vitamin B_1 deficiency. It is suggested that all cases of bilateral retrobulbar neuritis should be investigated as regards the vitamin B content in the diet, particularly if associated with evidences of pellagra, beriberi or peripheral neuritis and treated accordingly. R. J. B.

GLAUCOMA, ITS TYPES AND DIAGNOSTIC SYMPTOMS. Noyes, H. G. Optical Journal and Review of Optometry. 1941, 78, 23, 18-20.

Glaucoma is reviewed in its various types including symptoms and signs. Noyes divided this ocular pathologic condition into the following six classifications: (1) Chronic compensated or non-inflammatory. (2) Chronic congestive. (3) Acute inflammatory. (4) Secondary. (5) Infantile. (6) Absolute. The author reviews also the common ocular conditions which at times result in glaucoma and presents all the diagnostic signs of the condition. Emphasis is placed in diagnosis so that sufferers who consult optometrists may be referred for medical treatment in time to preserve all possible vision. L. P.

DISEASES OF THE RETINAL BLOOD VESSELS. BRITISH AND AMERICAN VIEWS CONTRASTED. Kera, H. M. Columbia Optometrist. 1941, 15, 60.

In looking for retinal arteriosclerosis, Kera suggests using the technique of direct ophthalmoscopy. His paper describes the various types of this condition and mentions the fact that the phenomenon seen at the arterio-venous crossings called Gunn's phenomenon, while accepted here in America as a diagnostic indication of retinal arteriosclerosis, is not recognized as such in England. The author mentions several other of

the diagnostic syndromes of retinal arteriosclerosis in which there is little agreement between British and American ophthalmologic specialists.

C. G. K.

DISTURBANCES OF THE THYROID AND PITUITARY GLANDS AFFECTING VISION. Melhuish, H. Dioptric Review and British Journal of Physiological Optics (London). 1941 (New Series), 2, 2, 95-101.

Melhuish presents the diagnostic syndromes of hyperthyroidism and thyrotoxicosis, including those visual symptoms that frequently make patients with either of these conditions consult an optometrist. This material is presented in considerable detail. C. C. K.

OCULAR INJURIES. Wood, G. H. Eye, Ear, Nose and Throat Monthly. 1941, 20, 11, 337-338.

Wood points out that homatropine and atropine are important drugs and should be used freely in cases of ocular injuries. Glaucoma may develop in elderly patients, but eyes that have been injured tolerate these drugs well. In removing corneal foreign bodies the rust and debris should be carefully cleaned out. To remove only the object is inadequate treatment. The pain and irritation persists and an iritis may develop. Antiseptics play very little part in most eye cases. Medicine of this kind instilled into the eye is soon washed out. If it is strong enough to kill organisms it is usually harmful to the cornea itself. Wood suggests the use of a tight bandage in all cases of ocular injury. He claims that corneal tissue will heal faster if the lids are bandaged together. L. P.

TRIFACIAL NEURALGIA. Rogers, P. W. Columbia Optometrist. 1941, 15, 58, 3.

Patients suffering from trifacial neuralgia sometimes confuse their painful symptoms with those of some ocular problem and Rogers therefore presents the etiology, prognosis and treatment of trifacial neuralgia, this being of dental origin. C. C. K.

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7. OPHTHALMIC LENSES AND MATERIAL.

TUBULAR SPECTACLES. Barnett, A. Optical (London). 1941, 102, 2646, 244.

Tubular spectacles, made without ophthalmic lenses, were first used in the latter part of the 17th century to improve vision at the near-point while reading. They fell into disuse after a short period and were not again brought into use until 1898 when they were mentioned in the ophthalmic literature of that period by Priesly Smith who suggested their use in certain cases of squint. T. O. B.

POINTS ON CONTACT LENS FITTING. Lippmann, F. M. Optical Journal and Review of Optometry. 1941, LXXVIII, 22, 22.

Lippmann believes the molding or casting technique in making contact lenses presents no advantages over other techniques used in prescribing these aids to sub-normal vision. The author also points out that certain patients seem to react better to the glass spherical type of contact lens while others adapt themselves better to the plastic and glass contact lens. The optometrist should be proficient in fitting both types. —C. C. K.

PREPARATION AND GRADING OF SEMI-POLISHED LENSES. Zettel, J., and Fry, G. A. Optometric Weekly. 1941, 32, 40, 1131-1132.

"A method for preparing semi-polished lenses with pitch impregnated pads has been described in detail. An attempt has also been made to determine the relation between the duration of the polishing process and the contrast threshold and visual acuity. The use of such lenses in the treatment of amblyopia is also discussed."—C. C. K.

Current Comments by Carel C. Koch

A Monthly Department

in which the Editor of the AMERICAN JOURNAL OF OPTOMETRY & ARCHIVES OF THE AMERICAN ACADEMY OF OPTOMETRY will discuss items of news of general interest: such as relate to new instruments, clinical techniques, education, public health, and optometric legislative and organization problems.

CLASSIFICATION IN THE ARMY

"On circling through a number of naval stations and army camps, Fred Hoehler,[1] Director of the American Public Welfare Association, talked to a number of former employees of welfare agencies, some in Red Cross work and others in the Army. Out of these talks comes one important suggestion . . . It has to do with the information required by the Army in order to classify an individual when he enters service.

"Men entering the service have been advised to be prepared to give a somewhat detailed statement as to training and experience to permit the classification office to put them at the best job for which their abilities suit them. Says the News Letter from APWA, 'Several men found it very useful to carry with them a small slip of paper on which they had typed a record of their experience in which there was a brief description of the job which had to be done and the skills necessary on the job.'

"Several men said that this more detailed information, set down leisurely and with some thought, helped in their getting properly placed in the Army. It helped get a good interview in the induction center and to give the Army complete and accurate information. Army officials, too, felt that it was a real help to get information in a usable form. (It may be explained that the information on the classification card is in general the basis for assigning recruits and inductees to specialized jobs.)"

Optometrists who are planning to enter military service would do well to consider the advice presented by Mr. Hoehler. A written record which reviews the practitioners educational background and training, as well as a review of professional and civic activities carried on since leaving college, will be helpful to him and to the Army classification department. The data so recorded should enable the optometrist to enroll in work of such character as to in part at least make use of his special skills.

[1]Social Welfare Review. Published by the Division of Social Security, State of Minnesota, St. Paul, Minn. Vol. 3, No. 12, p. 5. 1942.

TRANSACTIONS OF THE AMERICAN ACADEMY OF OPTOMETRY

by J. Fred Andreae, Secretary

A department devoted to announcements, reports, appointments, organization data, news, professional problems and ideals, as these relate to the Academy.

ACADEMY BREAKFAST AT DALLAS

Fellows of the Academy attending the American Optometric Association Congress in Dallas, Texas, had breakfast together on Tuesday, June 23, at the Adolphus Hotel. This has been the custom at each A.O.A. Congress the past several years and most of the Fellows present at the Congress attended this meeting. Those attending were: Dr. I. M. Borish, Chicago, Ill.; Dr. J. E. Corbett, Boston, Mass.; Dr. M. L. Dicus, Washington, D. C.; Dr. R. Ehrenberg, Granite Falls, Minn.; Dr. W. C. Ezell, Spartansburg, S. C.; Dr. A. Fitch, Philadelphia, Pa.; Dr. N. Greenman, San Antonio, Texas; Dr. E. A. Hutchinson, Los Angeles, Calif.; Dr. O. H. Johnson, Jonesboro, Ark.; Dr. B. Kehl, Memphis, Tenn.; Dr. E. Kiekenapp, Minneapolis, Minn.; Dr. W. F. Kimball, St. Joseph, Mo.; Dr. L. Kraskin, Washington, D. C.; Dr. S. K. Lessor, Fort Worth, Texas; Dr. H. Pine, Chicago, Ill.; Dr. Charles Sheard, Rochester, Minn.; Dr. C. R. Wells, Boston, Mass., and Dr. J. O. White, Baton Rouge, La. Arrangements were cared for by Vice-president Curtis R. Wells who read a letter of greeting from the president, Dr. Arthur P. Wheelock who was unable to be present.

The Executive Committee of the Academy requests that Fellows entering the armed services of their country notify the Secretary of the Academy at once.

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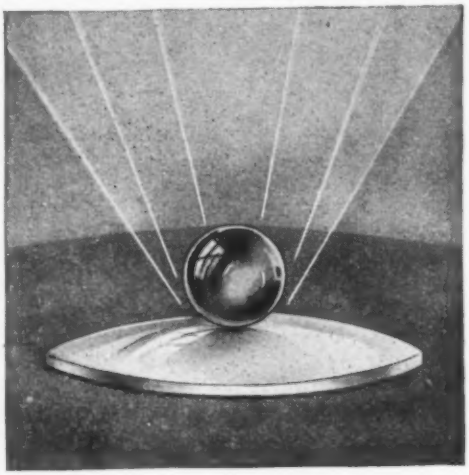


Resists breakage

Benson Fortified Ophthalmic Lenses

HARDRx Prescription lenses are for general use and are tempered for increased margin of safety against breakage.

BENSAFE Prescription Safety lenses are of heavier construction and toughened for industrial and hazardous sportswear.

Both are of highest quality and are toughened by a controlled heat treatment. Each HardRx lens is subjected to impact of ½" steel ball dropped one meter and Bensafe lens to ¾" steel ball dropped one meter.

Drop Ball Test for controlled strength

N. P. BENSON OPTICAL CO. Inc.

Established 1913

Main Office: MINNEAPOLIS

Aberdeen - Bismarck - Duluth - La Crosse - Stevens Point - Eau Claire - Wausau - Albert Lea - Winona - Rapid City

THE ... OF A K Bifocal

THE ONLY FLAT TOP ONEPIECE BIFOCAL

ULTEX K

Every ethical optical man will welcome the new availability of K Ultex. Complete base stocks are now on hand. A reduction in K consumer prices makes it easier than ever before for the doctor to fit this decidedly superior bifocal. A reduction in blank and Rx costs maintains the liberal profit margin.

BEST BY EVERY OPHTHALMIC TEST

1. Sharp, wide angle vision through **both** reading and distance portion.
2. Optically true surfaces, cold pitch polished like finest instrument lenses.
3. Keen definition, no hazy image from injurious fusing processes.
4. Free of color fringes.
5. Can be ground thinner.
6. Thin segment shoulder; no annoying shoulder reflections.
7. Jump is practically eliminated.
8. Wider reading field, due to **inside** segment.
9. Full useful segment, conforms to charted course of the eye in reading.

Price protected K Ultex may be prescribed or sold only by licensees. Write us for details of the license plan.

MINNESOTA OPTICAL COMPANY

2928 Lyndale Ave. So. -:- MINNEAPOLIS, MINN.

*The Patient Who Just Couldn't Say No**

DR. SMITH: "Sun glasses? Why yes, we can supply them, Mrs. Brown. Of course you want genuine ophthalmic lenses, don't you?"

MRS. BROWN: "Oh, but definitely."

DR. SMITH: "Then I would suggest that the best lenses for you would be one of the darker shades of the absorptive lenses most widely prescribed for general wear."

MRS. BROWN: "That does seem best."

DR. SMITH: "Appearance is a consideration. In addition to having lenses that are pleasingly toned, I assume you will want to select an attractive frame or mounting for them."

MRS. BROWN: "That *is* a nice thought! They will really be custom-made glasses then, won't they?"

DR. SMITH: "That's right! So since you obviously want the best for your eyes I recommend Sport Shade Soft-Lite Lenses. These are regarded as the finest lenses available and you may choose between three shades . . . No. 3 shade, providing 29.5% light absorption; No. 4L shade, which gives 46.4% light absorption; and No. 4D shade, providing 64% light absorption."

MRS. BROWN: "Oh, I've heard about Soft-Lite Lenses. May I have them ground to my prescription?"

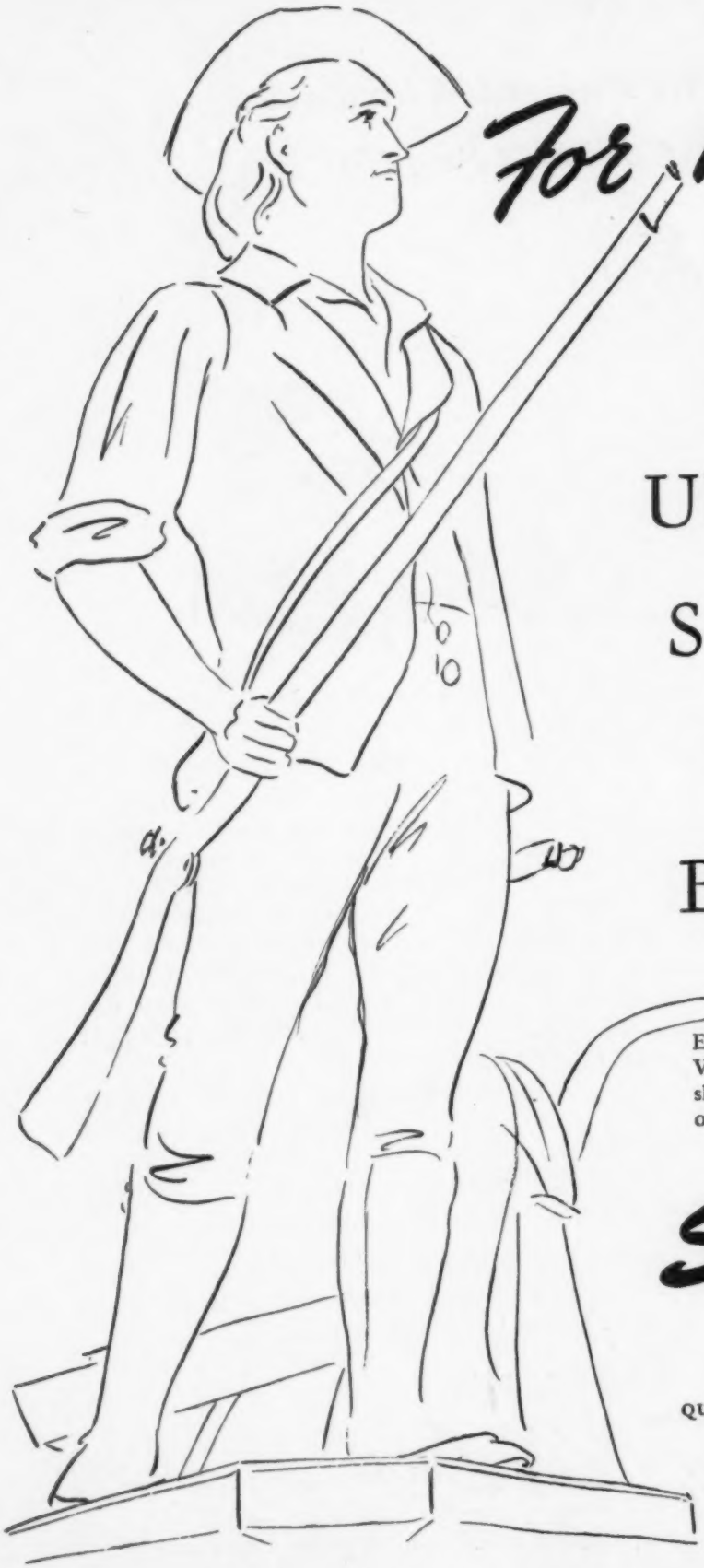
DR. SMITH: "Indeed you may. I was going to recommend that next!"

. . . And that's the way it's going this summer! Patients who want the best prefer custom-made sun glasses made with Sport Shade Soft-Lite Lenses. Consider their advantages!

SPORT SHADE

Soft-Lite Lenses

***Which, like most fiction, is based solidly on everyday experience.**



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WAR
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Every Bond purchased brings Victory a little closer. Buy a share in America—regularly out of income.

Shuron

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QUALITY BEYOND QUESTION
SINCE 1864